CHAPTER 2
Demand Estimates and Projections

The Year 2025 was identified as the planning horizon for the assessment of water use impacts. By the end of this 20-year water planning timeframe, average water demand is projected to increase 64 percent. In 2000, the total estimated water use for the Kissimmee Basin (KB) Planning Area was approximately 263 million gallons per day (MGD). Current trends indicate average water demand will reach 432 MGD by 2025. Agriculture, historically the region's largest water user, will soon be surpassed by Public Water Supply as the area's population continues to increase and agricultural lands decrease. This significant shift in water demand poses several challenges for water supply planners, especially since water supply available for use from the region's traditional resources is scarce.

The term "estimate", as used in this document, refers to information gathered from reported public water supply use and calculated water use for all other water usage categories. "Projections" refer to calculations used to forecast numbers for future time periods based on estimated land use and population forecasts.

The estimations of baseline and projected water use information are important steps in assessing the impacts from increases in traditional water use. Establishing a baseline period allows for the collection of water use records and estimation of unit rates of use to make projections. Year 2000 served as a baseline for the 2005–2006 Kissimmee Basin Water Supply Plan Update (KB Plan Update), as well as for the planning efforts of the St. Johns River Water Management District (SJRWMD) and the Southwest Florida Water Management District (SWFWMD).

1-in-10 Year Drought Condition

A l-in-10 year drought condition is defined as below normal rainfall with a 90 percent probability of being exceeded over a 12-month period. This means there is a 10 percent chance that less than this amount will be received in any given year. Subsection 373.0361(2)(a)l, Florida Statutes (F.S.), states the level of certainty planning goal associated with identifying demands shall be based on meeting demands during a l-in-10 year drought event.

DEMANDS BY WATER USE CATEGORY

Total water demand for the Kissimmee Basin (KB) Planning Area is projected to increase by approximately 169 million gallons of water per day (MGD) to 432 MGD. The region's more heavily populated Orange and Osceola counties will continue to require a majority of the public water and domestic self-supplies. And, as urban development displaces additional farmland, agricultural activities will be concentrated in the Lower Kissimmee Basin.

Water Use Categories

Public Water Supply refers to all potable (drinking quality) water supplied by water treatment facilities with projected average pumpages for 2025 greater than 100,000 gallons per day (GPD) for all types of customers. The remaining water use categories are all self-supplied.

The **Domestic Self-Supply** category includes households served by small utilities and/or private wells.

Agriculture water is used for crop irrigation, cattle watering and aquaculture.

Commercial and Industrial are business operations using a minimum water quantity of 100,000 GPD.

Thermoelectric Power Generation water is consumed by power plants in the production of electricity.

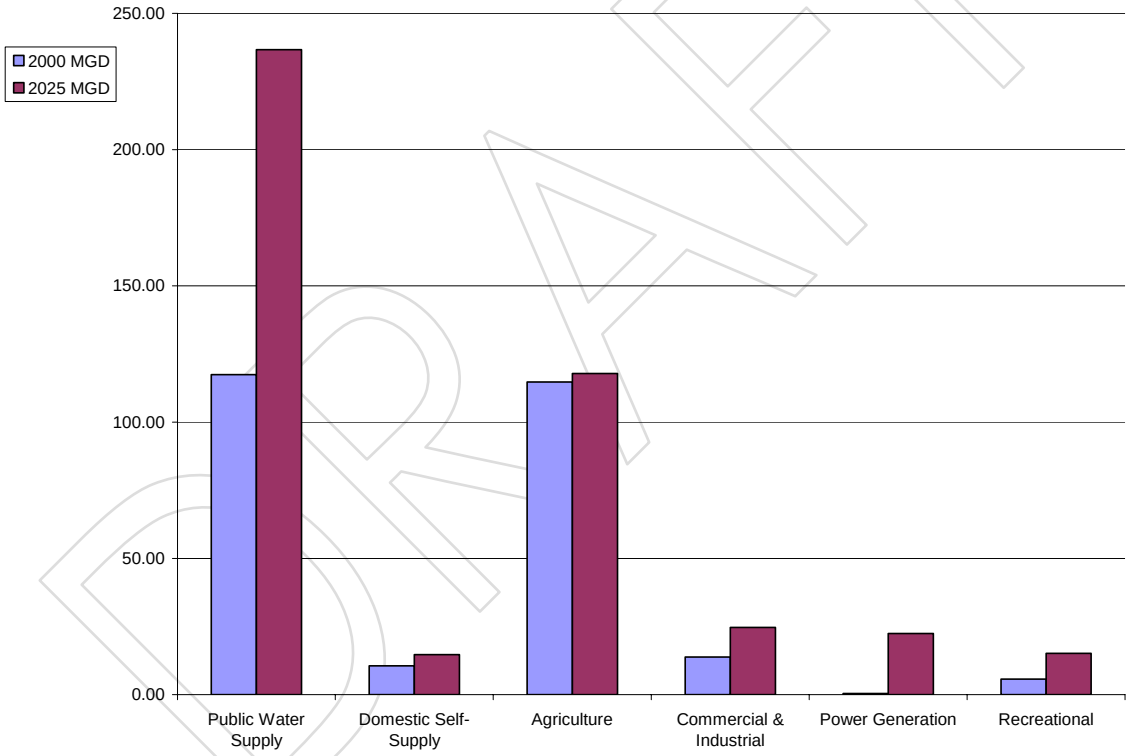
Recreational water use includes golf course irrigation demand. The Landscape subcategory includes water used for parks, cemeteries and other self-supplied irrigation uses with demands greater than 100,000 GPD.

Water usage demand estimates for 2000 and projections for 2025 were made for six water supply categories—Public Water Supply, Domestic Self-Supply, Agricultural use, Commercial and Industrial, Thermoelectric Power Generation Self-Supply and Recreational and Landscape Self-Supply. Key points include:

- Basin-wide, the demand for Public Water Supply is expected to double by the Year 2025. This water supply category will represent approximately 55 percent of the region's total water supply use.
- Agricultural water use is projected to show modest overall growth of about three percent; and remain the second largest consumer of water in the Kissimmee Basin.

- Thermoelectric Power Generation self-supply will experience the greatest percentage increase as a single water use category. Future demand projections reflect the additional 22 million gallons of water per day required by Florida Power & Light's new power plant.
- The remaining water use categories—Domestic self-supply, Commercial and Industrial, Recreational and Landscape—will also experience increased demand totaling almost 13 percent of water usage by 2025.
- The implications of the area's water usage changes require a commitment to a coordinated water planning effort.

Figure 1 shows the water demands by use category.



	Public Water Supply	Domestic Self-Supply	Agriculture	Commercial & Industrial	Power Generation	Recreational	Total
Estimated 2000 MGD	117.41	10.60	114.75	13.83	0.46	5.71	262.76
Projected 2025 MGD	236.65	14.70	117.86	24.71	22.46	15.13	431.51
% Change MGD	102%	39%	3%	79%	4783%	165%	64%

Figure 1. Water Demands by Use Category (MGD).

POPULATION AND WATER SUPPLY USE TRENDS

The region's population is expected to increase nearly 150 percent from 2000 to 2025. As indicated in the following table, Orange and Osceola counties will experience the greatest rates of growth. **Table 1** provides a summary of the population estimates for the six counties located in the KB Planning Area. The distribution of population estimates is based on University of Florida Bureau of Economic and Business Research (BEBR) values distributed using traffic zone analyses and utility service areas. The previous table in **Figure 1** provides a summary of the change in average water demand use between 2000 and 2025 for all water supply categories.

Table 1. Population in the KB Planning Area, 2000–2025.

County Area	2000			2025		
	Total	Public Water Supply	Domestic Self-Supply	Total	Public Water Supply	Domestic Self-Supply
Southern Orange	220,065	216,508	3,557	513,619	488,657	24,962
Western Osceola	171,416	152,180	19,236	517,000	495,752	21,248
Eastern Polk	14,518	6752	7,766	20,826	9307	11,519
Eastern Highlands	7,636	1,722	5,914	10,794	2,168	8,626
Northern Glades	3,665	2,529	1,136	4,956	3,324	1,632
Western Okeechobee	33,321	19,742	13,579	43,055	28,557	14,498
Total Planning Area	450,621	399,433	51,183	1,110,200	1,027,765	82,485

Source: U.S. Bureau of the Census, 2001 and University of Florida Bureau of Economic and Business Research, 2005.

Public Water Supply and Domestic Self-Supply

[@ This section should discuss both the population growth and its influence on water demand. However, this section only discusses population – need to add discussion on water demand.] The population of Orange County is expected to more than double over the next two decades; and, Osceola County's population will triple during the same time period. Combined growth for Glades, Okeechobee and Highlands counties is anticipated at a nearly 30 percent increase.

Public water supply and domestic self-supply water use are tied to estimates and projections of permanent resident population and historical per capita water use rates. With the increase in the full time resident population, seasonal fluctuations have less impact on overall water demand. County level estimates and projections of population for all counties are consistent with the 2000 Census of population and medium population

projections from the University of Florida, Bureau of Economic and Business Research (BEBR).

The urban demand assessment for public and domestic self-supplied water usage incorporated median population data from the U.S. Bureau of the Census and BEBR for all counties in the region with the exception of Western Osceola County. Consistent with the requirements of Subsection 373.0361(2)(a), Florida Statutes (F.S.), the South Florida Water Management District utilized the county's BEBR high value estimate for its population. The county received authorization from the Florida Department of Community Affairs (FDCA) to use the high BEBR estimate for its population as supported by that local government's comprehensive plan.

All projections were coordinated with the utilities and their local government comprehensive plan population projections, using the best information available. Estimates for public and domestic water use were developed based on Year 2000 per capita use rates by utility and the distribution of BEBR population estimates into and outside of utility service areas using GIS techniques.

Conservation measures were not factored into the demand projections used in this chapter. Rather, conservation is considered a water source option and discussed in **Chapter 5**.

Agricultural Water Use

Agricultural water use demand reflects projected acreage, crop types, growing seasons, irrigation system types, soils and irrigation strategies. While the agricultural water use category is expected to change from 44 percent of current total water supply to 27 percent by 2025, this water use category will increase slightly and be the second biggest water user in the region. Estimated demand for agricultural water use is projected to rise three percent to an estimated 118 MGD. Residential development, environmental restoration, loss of citrus acreage to past freezes and disease are some reasons for the decline in irrigated agricultural acreage.

Economic forecasting for agricultural areas rapidly transitioning to urban use has been an added challenge for water planners. The 2005–2006 KB Plan Update estimates of new agricultural operations are more conservative than those created for the 2000 Kissimmee Basin Water Supply Plan (2000 KB Plan). Agricultural acreage growth trends (particularly citrus in the southern half of the Kissimmee Basin) have flattened in recent years. This trend was not observed at the time of the 2000 KB Plan. For example, the projection for irrigated agricultural acreage in the 2000 KB Plan anticipated a significant increase in citrus acreage (the dominant crop in the region), whereas this 2005–2006 KB Plan Update anticipates a modest decline. Additionally, in 2000, there were several agricultural corporations in the region indicating significant expansion plans for vegetable and row crops; however, as of this update, these plans have not been fully executed.

Agricultural self-supply demand calculations for the 2005–2006 KB Update were made using the Agricultural Field Scale Irrigation Requirement Simulation (AFSIRS) Model. Change from the use of the Blaney-Criddle method to AFSIRS was made because AFSIRS was regarded by staff to more accurately predict actual water use. The AFSIRS model can be used to predict gross and net irrigation requirements. The gross demand values were used to address soil and irrigation system impacts on water use. Estimates for pasture irrigation were not included in the total demand estimates, as water for this type use is thought to not typically be used during 1-in-10 year drought conditions. These changes from the 2000 KB Plan caused the overall water use estimated for agricultural water use to be reduced for the plan update.

Commercial and Industrial Self-Supply

Commercial and industrial use is expected to keep pace with urban growth, but this growth is expected to be served primarily by local utilities. Data for the 2000 demand estimates for this use category was collected from consumptive use permit reporting and represents self-supply activities not served by a local utility.

Year 2025 demand projections are approximately 25 MGD, a 79 percent increase from 2000 commercial and industrial water use in the region. However, in total, this water usage category will represent only 6 percent of the total projected water demand in the region. Projected water use in this category is significantly higher than estimated in the 2000 Kissimmee Plan. This revised projection represents a number of new industrial projects previously not identified or permitted.

Thermoelectric Power Generation Self-Supply

The Kissimmee Basin's need for additional power supplies is expected to grow as its population expands. Florida Power & Light, the region's largest power utility, plans to use more fresh or brackish water in its new plant's cooling technology. Florida Power & Light's power plant, located in Okeechobee County, will withdraw water from Lake Okeechobee or a regional reservoir. As mentioned earlier in this chapter, water use for power generation demands will grow to 22.5 MGD by 2025, up from .5 MGD demands in 2000. Florida Power & Light's projected water supply needs represent the entire usage increase reported for this category.

Recreational Self-Supply

Recreational self-supply water usage projections primarily include water demands for golf course irrigation and are typically identified through their consumptive use permits. Landscape irrigation demand projections are included with this category. Recreational and landscape use is expected to keep pace with urban growth, but most of this new growth is expected to be served with reclaimed water.

Demand for golf course irrigation is expected to exceed 15 MGD, a 155 percent increase [@ see Figure 1 – is 10% of the 165% for landscape?] in use, by 2025. In recent years, as the value of land has increased in central Florida, developers have converted several older golf courses into new residential communities. This trend is projected to continue in certain areas, but related water use changes are projected as minimal (and are captured within the public water supply demand category).

SUMMARY

Demand projections are based on the extrapolation of trends, circumstances and industry intentions that change over time. For example, observed and projected growth in citrus acreage during the preparation of the 2000 KB Plan has since reversed into a decline. While there have been acreage increases in ornamental nurseries, it is not equivalent to the reduction in citrus acreage. Trend changes such as this are incorporated in the five-year updates to the plan.

In summary, the major driving force behind the significant growth in water demands reflected in the 2005–2006 KB Plan Update is the region's anticipated population growth. Most of this growth, in absolute terms, is expected to take place in the portions of Orange and Osceola counties, which lie within the planning area.

People demand potable water and this demand is met by public water supply and domestic self-supply. They also demand water for irrigation of urban landscapes and recreational areas, such as golf courses. Additional population also leads to the formation of new businesses and more power generation.

For the 25-year period from 2000 to 2025, the planning area population growth of 660,000 is twice that projected in the 2000 KB Plan, which estimated a population growth of 324,000 from 1995 to 2020. The 2005-2006 KB Plan Update predicts a 25-year growth in urban demands of almost 166 MGD. The previous plan forecasted 89 MGD for 1995 to 2020. Clearly, an unanticipated and dramatic surge in demand has occurred and is projected to continue in the immediate future.

In contrast to the urban demand increases, a modest 3 MGD growth in agricultural water use is projected in this plan update. The 2000 KB Plan estimated 168 MGD in agricultural growth due to trends at that time. This change is due primarily to reduction or elimination of projected acreage from the previous plan. This previously projected growth largely took place in the southern portion of the planning area. In addition, agricultural demands are lower in this plan update because the present method of estimating demands (AFSIRS based) generally gives lower estimates of irrigation requirements than the previously used Blaney-Criddle method.

Appendix D provides a full description of the methods used to estimate water use for each major usage category.

REFERENCES CITED

United States Bureau of Census. 2001. *Florida 2000 Census of Population and Housing*. U.S. Department of Commerce, Washington, D.C. Available from: http://www.census.org.

University of Florida. 2006. *Florida State and County 2005 Estimate and 2005-2030 Projections*. Bureau of Economic and Business Research, University of Florida, Gainesville, FL.